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AUTHOR Batey, Anne; Cowell, Richard N.

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ABSTRACT

Distance education is a current "catch-all" phrase for any form of instruction in which the learner is linked to an educational institution and is formally enrolled, but instruction does not necessarily have to be delivered to or from an official school site. Distance education can provide equity and increase the quality of educational opportunity; it can also provide access to subject matter not available in the local community, interaction and joint activities with students in other schools, increased access to information/instructional resources, opportunities for staff development and inservice training, and increased school/community linkages. Examples of rural distance education projects in K-12 settings in various states and localities are: elective correspondence classes which can be taken for high school credit; courses in writing fiction using electronic mail; astronomy and calculus courses using audiographic resource development for vocational agriculture using telecommunications; and an electronics course using slow scan television and audiographics. Four examples of whole course delivery using satellite transmission are described, as are two examples of statewide distance educational networks. Most current K-12 distance education programs provide elective and enrichment courses or experiences supplementing the core curriculum. Such programs often have unanticipated side effects: increased communication/cooperation between schools and districts, parental involvement with courses, and mastery of a technology which students/teachers can apply to other areas. Key issues and concerns in distance education relate to curriculum development, teacher training, student support, certification and accreditation, management and scheduling, costs, funding, evaluation, and program integration. An appendix provides delivery, cost, and contact information on the projects, satellite systems, and statewide networks described in the report. (NEC)

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THE Northwest Regional Educational Laboratory

TECHNOLOGY PROGRAM

DISTANCE EDUCATION: AN OVERVIEW

November 1986

by

Anne Batey
Richard N. Cowell, Ed.D.

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Technology Program
Northwest Regional Educational Laboratory
300 S.W. Sixth Avenue
Portland, Oregon 97204

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CREDITS

Authors:

Anne Batey, Computer Education Specialist, Northwest Regional Educational Laboratory, Portland, Oregon

Dr. Richard N. Cowell, Educational Consultant, Portland, Oregon

Consultants:

Doris Bower, Educational Consultant, Seattle, Washington

Dr. William Bramble, Administrator, Alaska Department of Education, Juneau, Alaska

Bill Lahmann, Administrtive Assistant, Washington Department of Education, Olympia, Washington

INTRODUCTION

This paper is for those of you who are planners and decision-makers with ties to rural, isolated, or small schools. You probably have heard about distance education and are interested in investigating further. Perhaps you are quite familiar with a specific project or a certain technology used to deliver instruction at a distance and want to know about others. Maybe you are just beginning to plan a project and need a good overview of important considerations in distance education. This paper should prepare you to ask the right questions as you plan.

In February 1986, the Technology Program at Northwest Regional Educational Laboratory (NWREL) coordinated The Second National Educational Leadership Conference. Technology specialists from over 40 State Departments of Education attended the two-day conference which included a strand on distance education. There were 12 presentations from representatives of distance education projects large and small. Four panel sessions provided further dialogue among these representatives. The level of interest and the quality of the information presented prompted us to work on ways to share what we learned.

Following the decision to prepare a paper for Northwest area educators on distance education, we visited projects, interviewed project representatives by phone, surveyed the literature and brought together experienced distance education practitioners in discussion sessions.

Part I of this paper is answers to five questions, presenting an overview of the current status of K-12 Distance Education. Part II is a thorough discussion of the key issues and concerns in Distance Education.

PART I: QUESTIONS AND ANSWERS

WHAT IS DISTANCE EDUCATION?

Distance Education is a current "catch-all" phrase for something as old as correspondence courses and as new as interactive instruction by satellite. Many definitions have been offered in what has become extensive literature on distance education. Definitions can be very broad--

> "All teaching methods and media except face-to-face teaching." (Schwalbe, quoted in Wedemeyer, p.49)

or they can be highly specified--

> A method of imparting methods, skills, and attitudes which is rationalised by the application of division of labour and organisational principles as well as by the extensive use of technical media, especially for the purpose of reproducing high quality teaching material which makes it possible to instruct great numbers of students at the same time wherever they live. It is an industrialised form of teaching and learning. (Peters, quoted in Stewart, Keegan and Holmberg, p.6)

Between these two definitions there are intermediate points. There are definitions that emphasize the learner--

> "Instruction which takes place when the learner is distant from the instructor and/or the instructional materials." (Levinson, p. 2)

and definitions that emphasize the delivery--

> "Refers to mediated learning, where the instruction is mediated either by physical distance or by technology." (Hudson and Boyd, p.1).

For this paper, we define distance education as a set of three elements:

1. Communication between the teacher and the students is not face-to-face.

2. An organization plans, coordinates and supervises the program.

3. A technology based delivery system is often used (but is not required).

To clarify these key elements, we add the following:

- While distance education has broad application for learners of all ages, we focus on K-12 education.

- The amount and nature of "distance" in distance education is not important. Distance can be a product of social, political, or economic conditions as well as geographical separation.

- The learner is linked to an educational institution and is formally enrolled but instruction does not necessarily have to be delivered to (or from) an offical school site.

WHAT CAN DISTANCE EDUCATION DO?

We think it is important to establish a perspective on the capabilities of a distance education system. In doing so we hope to emphasize a major point: Distance education begins with a need; it does not begin with glamorous technology. There is a tendency to get caught up in the appeal and excitement of the capabilities of the latest technologies, resulting in hasty commitments to expensive purchases that in the end can't be used as intended.

The following should not be viewed as a package of functions that any distance education project will provide, but as individual possibilities which address a need. While you may be interested in all of the following, it is best to focus on a single need initially. Good planning decisions will proceed from a well-defined need and a sound distance education program will expand to meet your other needs.

1. Provide equity and increase quality of educational opportunity. In small or isolated high schools there may not be enough students to support advanced or specialty courses offered by larger or less isolated schools. Additionally, some schools may not be able to supply the resources or qualified staff to offer courses in certain areas such as science, foreign language, or vocational programs. The needs of the homebound student can also be met with a distance program.

2. Provide access to subject matter experts or career role models not available in the local community. Interactive technologies give students an opportunity to listen to and question individuals located anywhere on the earth. For example, students can converse with an astronaut, an author, a corporate executive, a state or national political figure, a Nobel prize winner, or a representative of a foreign embassy.

3. Provide interaction and joint activities with students in other schools. Here, the possibilities include simple sharing of everyday information between students in other communities, states or countries; cooperative units of study between schools; and extended classrooms where a few students at a school become part of a larger classroom pulled from several schools.

4. Provide increased access to information and instructional resources. Computer searches of subject-specific databases provide students with a vast amount of current information. Some of these databases include curriculum units which teachers and students can "download" off the database. The lessons require students to gather information from the database. For example, the AgriData Network, a database of interest to vocational agriculture teachers, provides daily agricultural market reports, news and trends, along with a collection of 500 lessons. As another example, a distance education system which includes a satellite dish can receive and temporarily store instructional programming on videocassettes, avoiding the long-term rights fees and storage costs of a large video library.

5. Provide opportunities for staff development and inservice training. With a distance education system in place, school faculty and staff may have access to distance coursework provided by postsecondary institutions or other agencies. Opportunities for staff development can range from single topic discussions or presentations to whole courses or degree programs.

6. Promote increased school/community linkages. A distance education program can extend to the community by providing credit or noncredit courses. Database access can be extended to interested community members. Community members can serve as resources or instructors in distance education courses for the school.

WHAT ARE SOME OF EXAMPLES OF DISTANCE EDUCATION PROJECTS?

Examples of distance education in K-12 settings are varied and easy to find today--five years ago this was not the case. New developments and lower costs in delivery technology are responsible. The following descriptions should paint a picture of the excitement and opportunity that distance education is generating in many classrooms around the country. We selected them to provide:

- Examples of some projects in the Northwest region of the country
- Examples of projects which are large and small in both scope and cost
- Examples of a range of delivery methods

The Appendix contains additional, specific information on each project: the delivery technology, costs, contact people, and vendor addresses.

CORRESPONDENCE CLASS

At Liberty High School in Spangle, Washington, students can sign up for an elective correspondence class and take just about anything they are interested in--as long as there is a correspondence course on the subject. Each term approximately 15 juniors and seniors can take such courses as wildlife management, creative writing or sociology for credit.

The school district purchases the courses and the students agree to complete them in a semester. If they do not, students must reimburse the school district. The school also provides the classroom and a certified teacher to support the students as they work on the course. The teacher manages the selection and purchase of the course, encourages student progress through the material, and proctors tests.

Although special education students have successfully completed correspondence courses, the school district reports that motivated, independent learners seem to get the most out of the expanded options provided by the correspondence class. The correspondence teacher often helps those students having trouble with a course by gathering additional materials to supplement the text.

INTRODUCTION TO WRITING FICTION USING ELECTRONIC MAIL

Four rural high schools in Oregon's Willamette Valley offer the same course on fiction writing using an electronic mail system. The schools formed a cross-district consortium and received a grant from Apple Corporation providing six computers, two printers, and a modem for each school. In the original plan, a master teacher from each school would be responsible for developing a curriculum and supporting a master teacher to conduct a class for students at all four schools using electronic mail. The fiction writing class began its second year in fall 1986 with sixteen students. So far, additional courses have not been implemented, although a science exploration course has been planned.

The electronic mail system is used to send lessons and assignments to the students. The students write their assignments offline and then send their work back to the master teacher. The master teacher can comment on and correct their work before returning it to students by electronic mail. The electronic mail system lends itself well to the writing process, allowing students to "publish" by posting work for other students to read. The students receive a high school elective credit and have the option to also receive college credit.

One student who enjoyed the creative writing course said she also enjoyed working with students from other schools. "There's usually so much rivalry between schools...There should be more things of a cooperative effort."

Each school in the consortium is responsible for any monthly phone charges and for training the students to use the word processing and telecommunications software. The school provides support for the master teacher; in the case of the fiction course, the teacher receives a stipend and must teach the course during prep period and after school.

ASTRONOMY AND CALCULUS USING AUDIOGRAPHICS

Following a pilot mini-course on Astronomy, six schools in rural New York began offering a full course on Calculus using an interesting, relatively economical technology. Audiographic teleconferencing is a

microcomputer-based system that functions much like an electronic blackboard. Using graphics tablets, the teacher or students can write just as they would on a blackboard except that it is displayed on the computer monitors at each site. Writing can also be superimposed on existing diagrams or frozen video images. A special modem is necessary but it allows both voice and data transmission over the same line.

Both courses used an interesting, nonstandard schedule. The astronomy course was offered after school yet 25 students enrolled. The teacher conducted the class from one of the participating schools. Over a period of eight weeks the class met 16 times for 45 minutes. The results of the pilot were favorable and an Advanced Calculus course was offered. This course was taught by a college professor from his home. Thirteen students at four schools "met" once a week as a group for a whole class presentation. On a different day each school had 25 minutes with the professor; this session was like "office hours," giving each student the opportunity for individual attention. During the remainder of the week, the students worked on assigned problems from the text and used an instructional software program on Calculus. They mailed their assignments and exams to the teacher and he would grade and return them. Students' median scores on the midterm and final tests were slightly below those of the freshman class at the college where the professor taught.

For both classes the students and teachers had initial preparation and training. All students met each other in a group orientation session. The teachers and class aides had additional training in both the technical aspects of the system and the presentation skills for distance delivery.

RESOURCES FOR VOCATIONAL AGRICULTURE USING TELECOMMUNICATIONS

Vocational Agriculture teachers and students at fifteen schools in rural Wyoming have found an answer to the need for current information. Textbooks and resource people were limited when trying to teach competencies such as: developing marketing strategies, managing livestock health, and selecting irrigation systems. Now they have access to an online information service called AgriData Network; it provides daily reports on market prices, news and trends. One additional feature of the service is extremely useful--there are over 500 lesson plans developed by teachers which can be downloaded and saved on diskettes. Teachers can edit the lessons to their liking and then students go online to collect information needed to complete the lesson.

While teachers report that students are showing more interest and enthusiasm for Voc-Ag class, community interest in the system is just as remarkable. Farmers and ranchers who are parents of the students drop by the school to get current market prices. Some districts have begun to post reports at the local coffee shop or feed store. Several teachers are preparing evening courses for adults.

ELECTRONICS USING SLOW SCAN TV AND AUDIOGRAPHICS

One-fourth of the students at Powers High School in Southern Oregon took an electronics course from a community college instructor located over 100 miles away. For nine weeks, eight students could see, hear and talk to the instructor; they could also watch the instructor point to places on circuit diagrams displayed on a TV monitor. After completing the course several students reported they are now very interested in electronics--a course that the school had been unable to offer.

The delivery technology included slow-scan TV, an audiographics system and audioconferencing. All of these transmit over phone lines. Slow scan TV compresses a video signal for phone line transmission. It can take up to a minute to display—the images are frozen so there is no full motion.

The content included lab sessions where the students worked on circuit boards. All lab materials, study guides, tests and homework were carried overland by the Educational Service District courier service. The classroom was monitored by the library aide and the forestry teacher.

SATELLITE DELIVERY: FOUR EXAMPLES

The following are four examples of whole course delivery using satellite for live transmission of video and audio signal. (Note: Each of these offer programming to school districts. Please see the Appendix for details about the service.)

Instruction via Satellite--Eastern Washington University and ESD 101

In September 1986, eighteen school districts in Eastern Washington began receiving Spanish, Precalculus, Advanced English, or Japanese beamed from a broadcasting studio on the Eastern Washington University campus. Over two hundred students are taking these one-way video and two-way audio courses which use a satellite to transmit the signal. This all began with the formation of a task force and a consortium of school districts. The university provides the "uplink" or the transmitting equipment, Educational Service District 101 in Spokane provides the educational coordination and the eighteen districts provide input on curriculum planning.

The courses require self-discipline and provide greater challenge for the top students. Some students report that it "feels like preparation for college." Students usually take tests and complete homework late in the week which is then mailed to the campus where graduate students grade and return them within three working days. Each remote classroom has a supervisor who was trained by the master teacher for each course. Most of the master teachers came from full-time teaching in conventional classrooms and still have part-time roles in those positions.

Arts and Sciences Teleconferencing Network--Oklahoma State University

The Arts and Science Teleconferencing Network began delivering for-credit high school German via satellite in January 1985. From an original partnership among Oklahoma State University, 10 public schools, and the State Department of Education, enrolled districts have expanded to around 100. Course offerings now include two full years of German and a full year of high school physics.

Each week, students interact with the instructor during two or three live, one-way video and two-way audio programs, which are broadcast from the OSU production facility. In the remaining days of the week, they work with instructional software which, in the case of German, includes speech generation and recognition. The students can hear correct pronunciation, practice pronouncing themselves, and be checked for correctness. Students also follow a textbook and lab manual. The physics course includes simple lab exercises.

Distance Accelerated Learning--Utah Board of Education

When the state university system in Utah added a foreign language entrance requirement, rural schools in Utah had a big problem. A solution was found in accelerated learning theory and technology, including satellite delivery. A cooperative effort of the Utah Board of Education and IBM resulted in a Spanish course piloted in 23 school districts, reaching 500 students in the Fall of 1985.

The course is intensive; students attend a 90-minute session each day which is divided between a satellite transmitted broadcast and classwork which includes group conversations and computer drill. During the broadcast, students have contact with the instructor through a toll free phone number. The computer software has speech generation so that students listen to native speakers pronounce a phrase then, the students pronounce the phrase which can be played back to self-check against the native speaker.

The first year evaluation showed that students learned and retained Spanish as well as they do in conventional classrooms. In its second year beginning fall 1986, each broadcast has been prerecorded but distributed using the satellite broadcast. Additional courses such as physics, driver education, and English as a Second Language are being prepared.

TI-IN Network, Inc.

TI-IN, the largest private venture delivering K-12 instruction via satellite began broadcasting in September 1985. It was developed cooperatively betweeen private enterprise and public agencies. The Region 20 Educational Service Center in San Antonio Texas provides the broadcast facility (and uplink), selects the certified high school teachers, and develops the lesson plans. The lessons are submitted to the Texas Education Agency for approval and accreditation. TI-IN is responsible for all the remaining coordination, including installing and maintaining equipment for the subscribers.

Over 20 courses were offered this fall (1986) to about 120 participating school districts in states as widespread as Texas, California, and Iowa. Subscribers have access to a large choice of high school courses and a comprehensive staff development series.

A TI-IN installation includes the satellite receive antenna, TV monitor, printer, and cordless telephone handsets for two-way audio communication.

STATEWIDE DISTANCE EDUCATION NETWORKS: TWO EXAMPLES

Minnesota

Minnesota is unique in the number of rural classrooms using two-way interactive TV. Close to 50 school districts, grouped in seven cooperative clusters, now have the capability of live two-way video and audio. Each participating school district has a TV classroom equipped with video cameras and monitors so that it can both send and receive video images between the other participating sites. Any TV classroom can be the source or a remote classroom. The distance teacher uses a switching device to choose among three cameras mounted to show either the teacher, the written material (from above), or special presentations like films.

The statewide network has evolved from development clusters of 4-9 districts who work cooperatively in planning and managing the system. Depending on local options the audio and video signals are carried by cable, microwave, fiber optics, ITFS, or low power UHF.

One cooperative began delivering courses in Fall 1984 and around 160 students chose from seven different courses. In the following year, 400 students selected from over 22 courses. Students have claimed that the distance courses make them feel more mature and responsible for their education.

Alaska

The Learn Alaska Network links the state through audioconferencing and instructional TV programming which is transmitted by the state's Alascom satellite. The network provides services to K-12 education, postsecondary education, and the general public. The services to K-12 include: delivery of preproduced instructional TV series to supplement ongoing instruction; production and delivery of programming on Alaskan subjects; and interactive programming on a limited basis which involves the audioconferencing network as well as the video component.

Due to current budget constraints the service provided by Learn Alaska has been cut back considerably. The audioconferencing component survives but the instructional television component is not operating.

WHAT ARE THE DELIVERY OPTIONS FOR DISTANCE EDUCATION?

In the preceding section, many technologies were mentioned and in some cases briefly described. This section does not explain delivery technology but serves to organize the range of options.

A list of delivery technologies can be organized by its primary presentation form. There is print, audio, video, and computer based presentation.

PRINT BASED

Media: textbooks, workbooks, test packets

Examples: correspondence courses, self-study packets

AUDIO BASED

Media: audiotapes, phonograph records, radio, telephone, satellite

Examples: foreign language tapes, audioconferences, radio courses

VIDEO BASED

Broadcast Media: full-power broadcast, ITFS, cable, microwave, fiber optics, satellite

Other Media: videotapes, videodisc, slow scan TV

Examples: two-way live classes, one-way live or taped

COMPUTER BASED

Media: computers, software, phone lines

Examples: mputer-aided instruction, electronic mail or computer conferencing, audiographic technologies

Both the number of presentation forms and the media chosen will determine the level of interactivity of the delivery system. The most interactive system presents live, two-way video and audio. In such a system where both the teachers and the students see and hear each other, the technology quite literally extends the classroom walls for miles. The student and teacher can interact much as they normally would in a conventional classroom. While high interactivity is certainly desirable it is not the only magic ingredient for a good delivery system. Features beyond the technology like good curriculum, good teaching, and good program organization are just as critical.

WHAT ARE SOME USEFUL GENERALIZATIONS THAT CAN BE MADE ABOUT DISTANCE EDUCATION?

- Interest in distance education, on the part of both educators and the general public, has grown rapidly in recent years.

- Distance education works. Where there has not been much conclusive evaluation of distance education at the K-12 level, results of evaluation conducted at the postsecondary level and within industry, show that students can learn at least as well by distance methods as they can by conventional methods.

- Successful distance education programs can be large and reach many students or small and reach only a few students. Each has its own variations and differences; each has its own special characteristics and flavor; and each has its own angle on the technology used, the content delivered, and the presentation of this content.

- Successful distance education programs can be either quite costly or surprisingly low in price. Cost comparisons to conventional education depend on the technology used, the number of learners served, and the locations of these learners.

- A distance education project usually begins with a specific need—a course which must be offered, a change in state requirements, or the like. The project usually addresses one need and then expands.

- Most successful distance education programs involve cooperation among schools, school districts, regional education agencies, or state departments of education.

- Distance education programs can be complete courses, supplements to standard courses, or enrichment activities. Most current K-12 programs provide elective and enrichment courses or experiences, supplementing the core curriculum.

- Careful planning, well-organized management, and effective program and student support are necessary for the success of distance education projects.

- Multi-media programs are likely to be more effective than programs with only one type of delivery.

- Distance education is not curriculum specific. All standard subjects normally taught in elementary and secondary schools (and many that are not normally taught) can be presented in some intellectually valid and effective way through distance methods.

- Successful distance education programs are based on current educational theory and practice.

- The master teacher or presenter of the distance education program is a crucial element in its success. In addition to being a subject matter specialist, he or she is highly motivated, enthusiastic, and charismatic and usually devotes much time and energy to the program.

- Successful distance education programs provide in-service teacher training. This is particularly true when new technology is used.

- Effective distance education can never be purely mechanical. Methods of meeting the social and emotional needs of the learners are built into the programs. Programs include methods for receiving feedback, help, and a sense of belonging to a classroom.

- Learners who are independent, self-starting and self-motivating help make a distance education program a success. Methods of motivating students and sustaining their interest are provided to ensure effectiveness.

- Distance education programs often have unanticipated side effects, such as: increased communication and cooperation between schools and districts, parental involvement with courses, and mastery of a technology which students and/or teachers can apply to other areas.

PART II: ISSUES AND CONCERNS

This section elaborates on many of the points raised in the previous section on generalizations, it does not, in most cases, provide answers to what can be very complex issues. This discussion should, however, bring the issue into focus so that you are prepared for seeking answers.

CURRICULUM DEVELOPMENT

The curriculum itself does not place constraints on distance education. Any subject matter that is normally taught in schools can be effectively presented in a distance education format. While research done to date does not indicate which delivery system is best for presenting a given content, there is a connection between the format of the presentation and the delivery system. For example, a pure lecture format would be inappropriate over an audioconferencing system since it does not engage students in much dialogue. On the other hand, it is the only format possible when radio broadcast or audiotapes are used as the delivery vehicle. In other words, if the delivery system supports an interactive format the curriculum format should be interactive.

The curricular ingredients of an effective distance learning effort are essentially the same as those of more standard methods of delivering educational content. Minimally, these are embodied in a course or program which includes the following:

- Is comprehensible to students
- Contains appropriate and easy-to-follow instructions
- Contains clearly and completely stated goals and objectives
- Uses materials (both primary and supplementary) and methods which are exciting, motivating and varied
- Meets the needs of students and adjusts for individual differences in abilities, desires and interests
- Is accurate and up-to-date according to the latest scholarly opinion
- Is clear, consistent and well-organized
- Is paced in a logical and flexible manner
- Contains fair, accurate and complete evaluation
- Contains pretests and other diagnostic procedures
- Meets the social and emotional needs of both students and teachers

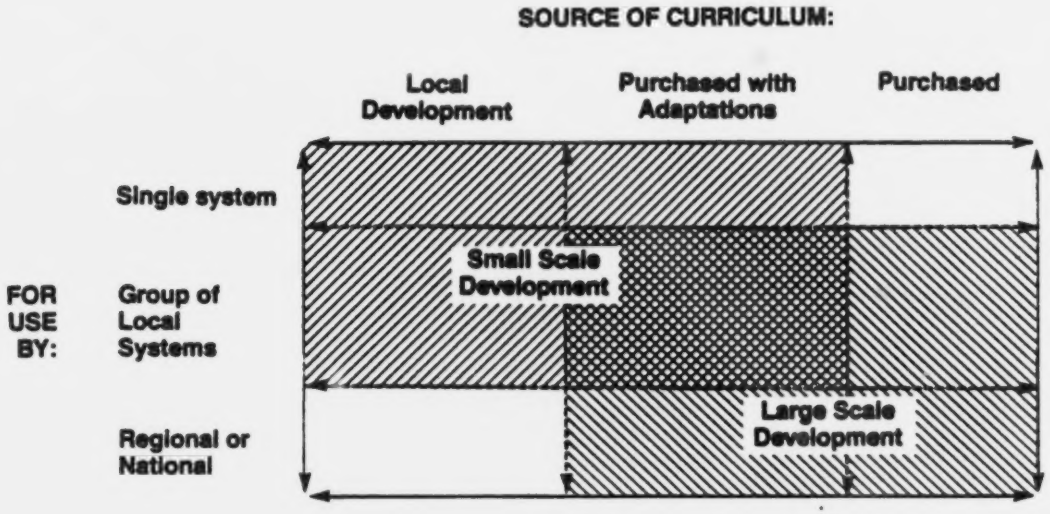
- Guides students to sources of help when they become bored or confused
- Has aesthetic appeal
- Articulates in a clear and appropriate manner with other courses, subject matter and grade levels
- Employs recordkeeping procedures which are manageable and not greatly time-consuming
- Employs technology appropriate for the content presented and for learners' abilities
- Employs technology that is "user friendly"--its use is well explained, it does not "get in the way" of learning and it overcomes the potential reluctance of teachers and students to use it

In addition to a list of characteristics that a distance education curriculum should have, there are development decisions for planners that must be considered:

1. Whether to purchase a curriculum (and delivery system) as opposed to developing one locally, and
2. Whether to develop curriculum within a single agency as opposed to some type of group development.

These issues are expressed in the following matrix:

DISTANCE EDUCATION CURRICULUM DEVELOPMENT OPTIONS



When the development route places the curriculum toward the upper left quadrant of this matrix, it is likely to be small-scale, relatively simple, relatively inexpensive, and aimed toward a particular school or student group. It may be supplementary in nature rather than providing a complete course of study. As it moves into the upper right quadrant, it will probably be more sophisticated and also more expensive, but still aimed at a specific audience. Curricula in the lower right quadrant will tend to be full-scale, professional productions, expensive--unless economies of scale can be achieved--and aimed at a large and diverse population. These curricula will usually be pre-packaged, complete courses which are carefully developed and evaluated. They are also likely to be provided as packages that include the delivery technology. Few curricula will naturally fall into the lower left quadrant. Some successful efforts which begin more toward the upper left may shift downward as their high quality becomes known and the demand for their use grows beyond the original audience.

The advantages of small-scale curriculum development:

- It is tailor-made for the participating students, thus it better meets the needs and goals of these students and of the school using them
- It may lead to cooperative efforts which increases communication among the participating schools or districts
- It may stimulate staff to think more often and more critically about curriculum content and presentation

The disadvantages of small-scale development:

- The quality of programs may suffer, as sophistication and expertise in curriculum and technology may not be in adequate supply
- Adequate funding may not be available
- Shortage of time and resources may mean fewer courses produced
- Some elements necessary for a complete program may be difficult to obtain

The advantages of large-scale development:

- It can be complete, up-to-date, and sophisticated in terms of both curriculum and technology
- It is usually of high quality, often supported by research, developed by experienced designers and educators, and usually presented by skillful and charismatic teachers using imaginative and carefully constructed materials

The disadvantages of large-scale development:

- It may be quite costly, even when economies of scale can be achieved
- Problems with teacher certification, program accreditation and scheduling may arise
- It is difficult to know exactly what the curriculum will accomplish
- The content and methodology is chosen by people not familiar with the conditions of the local schools and students

Regardless of how curriculum is developed and who will use it, it is essential that it be developed collaboratively by experienced teachers, content specialists and technical personnel. If experienced teachers are not part of the development team, the resultant curriculum may not be interesting to or appropriate for students or it may be too narrow for school courses as they are normally presented, offering the required coverage of material but not depth. If the curriculum specialists are not involved, the curriculum may not be technically accurate or up-to-date. And if technical personnel are absent, the technology may not be used to its fullest potential or costs may be increased because inappropriate technology is chosen.

TEACHER TRAINING

Good teaching is good teaching, whether the teacher and learner are in close proximity or are at a great distance from each other. However, many types of distance education imply, or in some cases demand, changes in teacher competencies and behavior. Whenever teachers are expected to adapt their teaching techniques, use new equipment and technologies, or relate to learners in different ways, there are important implications for both pre-service and in-service teacher training.

The latest technologies are unfamiliar to many teachers. With only a few exceptions, the best training is little more than a quick effort at the last moment before implementation or after problems have already appeared. Often teachers are left to grapple with the new programs on a "sink or swim" basis under the assumption that no training is required.

Teachers in charge of delivering educational material at a distance will need training and preparation for:

- Teaching lesson plans partly or completely developed by others
- Preparing very detailed lessons well in advance of delivery
- Teaching without a group of responsive students in attendance
- Teaching with new types of feedback (or, sometimes, with no feedback at all) from learners

- Organizing and structuring materials in new ways
- Systematically pre-testing materials and explanations for appropriateness, clarity and comprehensibility
- Pacing and delivering lessons in a different manner
- Presenting lessons according to strict and inflexible time schedules
- Balancing multiple materials and inputs to students
- Planning differently for the provision of social and emotional needs of student groups
- Projecting style and personality in new ways
- Operating new technology

Likewise, the teacher who supervises the students receiving learning at a distance will need training and preparation for:

- Using plans, materials and teaching methods largely devised by others
- Keeping to a schedule which is often not of his or her own making
- Preparing students to receive input in new and different ways
- Helping students to focus their attention on unfamiliar stimuli
- Helping students to make responses in a manner they may not be used to
- Using different methods to aid students in asking for help and assistance
- Employing new ways to promote student concentration and persistence
- Evaluating and rewarding students for new behaviors
- Teaching students to use new machinery and equipment, both hardware and software, with ease and confidence
- Scheduling repairs and maintenance of this equipment when indicated, and, on occasion, performing simple repairs
- Keeping new types of records and keeping these records in different ways

STUDENT SUPPORT

The self-motivated, task-oriented learner who is well-organized and independent is the ideal student for a distance education program. Indeed, this IS the ideal student. As we all know, such students are rare.

The "Hawthorne Effect," in which the novelty of an intervention causes increased motivation and improved performance, may help many distance education programs get off to a good start. However, most students need support of various kinds as they begin and proceed through distance education experiences. A distance teacher who is removed from the learner cannot provide the usual methods for guidance and support found in the traditional classroom. The personal interest, friendly direction, timely approval, encouraging comment, leading question, concerned intervention and subtle reward are difficult without face-to-face contact.

Advances in technology have meant increasing use of interactive delivery systems and these allow students to communicate with the distance teacher much as they can in a conventional classroom. However, this mediated communication may not be as personal or direct as is face-to-face contact. For some teachers and students it lacks the immediacy, intimacy and involvement of the traditional classroom. In addition, most interactive options are considerably more expensive than one-way systems; and they may be more difficult for both teachers and students to master as well.

Fortunately, alternatives for effective communication and support in distance education programs have been developed. Some of these attempt to provide support directly on a face-to-face basis by persons other than the primary teacher, while others rely on distance methods. When support is provided over distance, both frequent contact and a short turnaround time for all communication have proven crucial for success. Among the alternatives tried to date for providing this type of support are:

- Written communication sent by mail: personal letters, journals, logbooks
- Exchange of audio cassettes: voice letters
- Telephone contacts, either regularly scheduled or "on demand"
- Student get-togethers, either face-to-face or via telephone
- Training for aides or monitors so that they can provide help and support
- Group scrapbooks or photo albums
- Peer tutoring systems
- Tutorial groups, either in or out of school

- Materials for parents so that they can assist their children
- Electronic mail
- Imaginative supplementary materials featuring activities which integrate social and emotional concerns with subject matter content
- Connection of distance learning to regular courses so that the teacher of the regular course is available for help and advice
- Special recognition of schools, classes, or individual students during presentations or broadcasts

CERTIFICATION AND ACCREDITATION

Many of the dilemmas of certification and accreditation are presented in the following vignette:

> A small rural school district in the Northwest has several science students who have gotten A's in Biology and Chemistry, the only science courses it is able to offer. To meet the needs of these and a few other of its students, it joins with three nearby districts and employs a University of Oregon professor of physics to teach her subject by distance technology. The professor has a Ph.D. from M.I.T., has done postdoctoral work with a Nobel laureate, and has published two award-winning books in her field; but she does not have a state teaching certificate. In fact, she has never taken a single education course or taught at the secondary level before. She uses the state-approved course of study, but changes it in places. She finds the textbook adopted by the state to be out-of-date and recommends the approval of a newer one. She also develops a large amount of supplementary material and suggests that the districts purchase additional library resources. She is a rigorous, charismatic and popular teacher; and the students do unexpectedly well on school examinations and the SAT physics achievement test. Hearing of her success, other districts, one in a neighboring state and quite large, explore the possibility of using her services the following year. She could end up with as many as 150 students if the necessary agreements can be reached. An elderly shut-in lady, an ex-engineering student who is now a farmer, and two curious real estate salespeople also ask to take the course. (adapted from O'Connor and Levinson, p. 37)

While this vignette is fictional, there is no reason that some version of it could not happen. Were this to occur, the following questions related directly or indirectly to certification and accreditation would be raised:

- Should this teacher be allowed to teach without being properly credentialed by the state?
- If she teaches in two states, will she need two different certifications?

- Should she be allowed to teach with materials not formally approved by the state?

- What authority does she have to require the various districts to purchase new textbooks, library resources or other materials?

- Can the course she teaches be accredited? If so, by whom and according to what criteria?

- As her class size grows, how will this affect the average daily attendance formula the state uses to reimburse the districts?

- Who should monitor her classes, arrange materials, help students who are having problems, give evaluations, and perform other similar duties? What qualifications and credentials will they need to have?

The teaching credentials of a master teacher, tele-teacher or other "presenter" can be an issue where delivery is across state boundaries, school district lines or grade levels. Sometimes it is possible to view the distance teacher not as a person but rather as instructional material. He or she becomes part of the course's "instructional package," not separate from the rest of the materials being delivered. Likewise, distance delivered content can be construed as a "textbook" or as some other more standard educational input. The State Department of Education needs to be involved in determining the limits of acceptability in such matters.

To solve the certification problem, sometimes the use of a "teacher of record" is possible. Such persons, no matter how active or inactive their roles may be, become certified surrogates. This can require an extra salary, and will therefore increase costs. Using teachers' aides will save money; but such people will not be certified, so new problems arise. Provisional certification for the distance teacher can also be a satisfactory solution in some situations. But, while such devices may help distance education programs function over the short term, they avoid such key questions as: Where, physically, does the certified teacher have to be? In every classroom or home where the program is received? With the source of the instruction?

A related problem occurs when the school staff at the receiving site is resentful of the intrusion of the distance teacher. This is especially true if they feel that the distance program is replacing certified teachers with a machine or with an improperly qualified person, even though the intent of the program is to make the certified teachers more effective or to reduce their work loads. Gaining the support and approval of the teachers' unions and other professional associations is necessary in the development of most distance education programs.

Historically, states (and the smaller entities such as school districts to whom states delegate their authority) control education. However, the federal government has a role in the careful regulation of communications activity. Distance education, with its heavy reliance on communications

of many types which cross state boundaries, has the potential for putting these two sources of authority in direct conflict. How such conflict will be resolved is far from clear.

States also have laws about attendance and student-teacher contact hours. These laws are often unique to each state. State funding and other benefits are usually determined by the number of students attending courses, and attendance records are kept on a daily basis. But in distance education, what does "attendance" mean? Which district gets credit for the students who attend a television course used in several districts or delivered to nonschool sites? Will school districts receive the same state payments for students learning via distance technologies as they do for students who are attending class with a regular instructor? Just as it makes no difference how many students use a given textbook, is the total enrollment in a distance education class also irrelevant? Will one school district raid another by offering distance courses to the second district's students?

Michael Goldstein has written an article which analyzes the issues of certification and accreditation in depth. In this article he says:

> An entity that obtains a package of instructional programs and acquires...the means of disseminating it to a dispersed learner population may bear no resemblance whatsoever to a traditional educational institution. To attempt to apply existing standards for the approval of an elementary or secondary school to such a provider of educational services may be impossible. (p. 15)

Similar issues exist when the receiver rather than the provider of such educational services is considered. Goldstein continues:

> A state law which requires an institution to maintain a library of a particular size may have little or no relevance to a computer-based system that enables a student in his or her home to access library collections thousand of miles away. Likewise, statutes and regulations that set standards for the number of hours in the academic day, that establish maximum class size requirements,...or that provide for the certification of instructors are either irrelevant or impossible to enforce with regard to telecommunications-based distance learning systems. (p. 20)

The implication of Goldstein's words is clear. Distance education may force us to redefine what a school is.

MANAGEMENT AND SCHEDULING

The more a distance education program differs from the normal events and procedures in a school district, school or classroom, the more new management skills will be required in order for such programs to succeed. In general, the aspects of management which most frequently change due to the introduction of a distance education program are:

- Establishing lines of responsibility
- Obtaining and handling funds

- Planning
- Recordkeeping and reporting
- Supervising students
- Obtaining, managing and repairing equipment
- Scheduling classes
- Scheduling existing staff
- Recruiting new staff
- Managing program change and updating program content
- Managing contracts and financial agreements
- Cooperating with other educators
- Dealing with new entities in the community and occasionally with new clientele

Of course, there are several levels of management that are involved in the introduction and maintenance of any new educational program. The most basic of these is at the classroom level. Many distance education programs do require new management procedures at this level, and therefore require new teacher management skills. A discussion of management in this sense is contained in the Teacher Training section of this paper.

Management skills needed at the building, district and higher levels are characterized by some observers as being more akin to those used in industry than those traditionally found in education. Many distance education systems are concerned with lead time, deadlines, print runs, job schedules, typefaces, warehousing, delivery and dispatch, equipment repair and the like. In some distance education programs many months or even years of planning and development are required before actual teaching takes place. Before such teaching can begin, a variety of issues not normally demanding the attention of schools will need to be settled. Among these may be:

- Fitting the use of technology to FCC and other governmental regulations
- Gaining state approval for new curriculum content and materials
- Certifying and accrediting new types of instructors and programs
- Searching for special funding

- Cooperating with educators in other schools, districts or other entities
- Reaching formal agreements with all cooperating agencies
- Mounting public relations and publicity campaigns in the local community or elsewhere
- Arranging for new types of teaching assignments
- Hiring and training of paraprofessionals
- Revising class schedules

Many distance education programs are, in one sense or another, cooperative in nature. This cooperation may be at various levels--federal, state, regional or local. Some schools and school systems are engaged in a number of cooperative efforts before the introduction of a distance education project, and some are not. In either case, management skills which foster designing, implementing, administering and evaulating cooperative ventures are often required. Among such skills are: communicating effectively, listening carefully, following as well as leading, compromising, helping others to feel comfortable, tolerating diversity, organizing effeciently and keeping track of detail, stimulating and encouraging others, and exercising patience and tact.

Finally, scheduling may become a special problem when a distance education program is introduced into a school. If the program originates from the outside, it may be broadcast only at specific times, and the whole school schedule will have to accommodate this rigidity. Most audio and video transmissions can be recorded and saved for later use without great increase in costs. However, when this is done, the live quality of the transmission will be lost and most interactive features present cannot be utilized.

If a distance education program is delivered to learners outside the school, other scheduling problems may emerge. This is especially true if some of these learners are not traditional students but are home-bound people, members of adult education classes, teachers in in-service training, or the like.

It is difficult to make generalizations about the management of distance education programs due to the great variety among these programs. Some programs may present many management challenges and require great changes in management style and procedures, while others may "slide into" a school with few if any management changes being needed. Research shows that the quality or management can "either make or break" a distance education program. It also shows that few management problems associated with these programs are insurmountable, although some solutions may be costly or time-consuming.

COSTS

The costs in distance education vary enormously. A random sampling of costs in distance education might contain the following information:

- Schools can buy new classroom computers for under $1000 each. Adequate printers are available at about $250. Most educational software costs between $25 and $75 a program.

- A school can subscribe to The Source or other similar data retrieval services for a $100 subscription fee plus $20.75 per on-line hour. A modem and accessories can cost $500. Phone charges for a class of ten daily users range from $40 to 150 per month.

- A Videodisc player retails for under $600, with a $50 to $75 average charge for each videodisc.

- Startup and first year operating costs for a live, interactive satellite course to serve a single school is costing $15,000-20,000 from commercial ventures.

- The South Carolina Educational Television Project estimates that in 1979, 1,691,669 students got ITV services at a cost of $5.83 per student per course.

- A sociology course by correspondence for one student costs $75.

- A Speakerphone system with volume control and a microphone for picking up voices several feet away can be purchased for $500, or rented for $12 per month, and installed for $25.

- The fee for participating in a teleconference network is approximately $10 to $30 per hour per site. With instructors' salaries added to this, teaching by teleconference costs about $10 per student contact hour.

- Providing teacher in-service by audioconference is approximately one-tenth as expensive as face-to-face instruction when distances to teacher education centers are great.

What is a decision maker to do with such diverse information? Hudson and Boyd help us begin to make sense of it:

> Measurement of costs depends on many factors. The most costly technologies may not result in high costs per student. For example, a telecourse delivered nationwide by satellite may have a very low cost per student, while an interactive videodisc developed for a specialized course may be much more costly on a per-student basis. Out-of-school projects tend to be highly cost-effective if they enroll sufficient numbers of students to share fixed costs. In-school projects which maintain a teacher-student ratio similar to that of conventional schooling do not reduce costs per student as

> much, since they do not substitute media for labor. The value of the in-school projects, when they are well-conceived and executed, lies in using the media to improve the system sufficiently to justify the additional cost. (p. 64)

As Hudson and Boyd point out, economies of scale are important. While costs of some programs may be high in an absolute sense, when divided by the number of students served, they are low. The economies achievable by distance education are, in general terms, a function of the amount and type of content to be presented, the size and location of the audience, the choice of media and the sophistication of production.

One problem, of course, is obtaining a clear picture of what is meant by "costs." The most common categories are:

> Capital costs. These refer to the money that must be spent on hardware--the actual equipment or facilities. Examples are satellite receivers, audioconferencing systems, mobile delivery equipment, facility remodeling and the like. These costs go down when they are amortized over the life of the equipment or facility.
>
> Development costs. These are the costs for putting the system into motion and getting the first presentation ready. These costs may make a distance education program more expensive its first year of operation. Such costs are easy to underestimate. Typical startup costs include expenditures for recruitment and training of the master teacher/presenter, teacher or teacher aide training, program and materials (both primary and supplementary) development, initial program production and delivery, materials reproduction and distribution, evaluation planning, recordkeeping and clerical support, management expenses, and miscellaneous supplies and equipment.
>
> Operating or Maintenance costs. These refer to money needed to keep the system operating smoothly and effectively once it has begun. These include equipment service and repair, purchase of expendable materials, salaries for aides or monitors, student transportation, administrative and coordination expenses, etc.
>
> Marginal costs. These are the costs to add one more site or one more student to an existing program.
>
> Expansion costs. These refer to the expenses associated with enlarging the program. They normally include the purchase or rental of new equipment, increased management costs, hiring new personnel, the costs of expanded delivery systems, publicity and public relations expenses and so forth.

In addition to dollar costs, there are the Time and Social costs. Time and energy are needed to plan, develop and implement a distance education program. The social costs include dislocation of staff, the confusion and sometimes hard feelings engendered when procedures and behaviors must be changed, and the necessity for explaning new programs to the community and enlisting its cooperation.

FUNDING

The issue of funding distance education programs is closely related to the issue of cost. State funding formulas based on attendance or teacher-student ratios make little sense for distance education programs which may have hundreds of students in many locations in different districts or even in different states, especially if some of these locations are not schools. Further, parents of a child participating in a distance learning program are not likely to be interested in paying taxes indirectly to a district in which their child is not enrolled. In analyzing this situation, Goldstein remarks:

> How the cost of that program is divided between the user districts and the provider of the service will vary from state to state, and even within states from one district to another...In some instances, the producing district receives a user fee from the recipient districts, analogous to the rental of other instructional materials. The fee is based either on a specific charge for the use of the programming or a per pupil fee. Alternatively, the cost is simply divided among the using districts (which usually includes the originating district), much as would the cost of operating a common athletic facility. (p. 10)

Funds for distance education may need to be aggressively sought by the school or district that wants to install such programs. There may be rules and regulations about how such funds can be obtained and used. This search for funding implies a new role for educational administrators.

Most distance education programs are cooperative in one sense or another, and many are cooperative in the area of securing funds. Multiple funding sources may be needed. Partnerships, collaborations and other joint funding efforts may be indicated. Local, regional, state and federal sources can all be tapped. What federal and state agencies are most interested in at a given moment may provide sources of funding when such interests can be integrated with distance education programs. Current interest in rural schools and "At-Risk Youth" would be examples. Also, foundations, universities and businesses can often be successfully approached for help in supporting new and imaginative educational ventures.

In small towns and rural areas where communities tend to be close-knit, business cooperation with schools is often well-established. The school may be the hub of such communities, and the social health of the community may partly depend on an active and vital school. This mutual dependence can often be helpful in fund raising. This is especially true when the distance education program can be useful to the community in meeting the needs of others.

Regardless of the funding source, it is very important to build in long-term support for the program. Funding that comes from a "one-shot" appropriation when the interest is high may cover the capital and startup costs—but then what happens? The message is clear; it is necessary to plan for the future of the program from the start.

Summary statements about the cost and funding of distance education are difficult to agree upon. But it seems fair to say that as long as distance education programs ar seen as extras, adjuncts, or add-ons to the basic effort of schooling as it is now organized, they are likely to prove to be expensive and difficult to fund on a long-term basis. However, when they are seen as one of the primary ways to deliver the basic instructional activities themselves, the cost of distance education may be low and its funding relatively easy.

EVALUATION

Evaluation should form a part of all distance education projects. While a great deal of evaluation has been done, much of it is inconclusive. Because most evaluation literature covers programs at the postsecondary level or in private industry, it is difficult to extrapolate from.

The evaluations of distance education programs focused on the K-12 level tend to show the following:

- Students learn as much through distance education programs as they do through conventional programs
- Students like distance programs as much as they like conventional programs

Research done at the postsecondary level in education and in private industry shows the same results.

Evaluation should be carefully planned at the beginning of any distance education effort. When feasible, an evaluator should be a part of any development team and should follow the project throughout its design and implementation phases, even though this may increase costs.

Elements to be considered in any formative evaluation of a distance education project include:

- Conducting a thorough needs assessment
- Studying the context in which the project will operate
- Analyzing policy and procedural alternatives
- Monitoring all major activities and processes of both development and implementation
- Determining the effectiveness of interim products, processes, systems, and management and development procedures and policies

- Providing continuous input to the design team
- Identifying problem areas

Elements to be considered in any summative evaluation include:

- Determining the success of major components, programs, and systems
- Determining the success of the project as a whole
- Measuring student completion rates, achievement gains, and satisfaction
- Measuring reactions and opinions of teachers, administrators, and the community in which the project is taking place
- Measuring side effects and unanticipated outcomes
- Determining desirable modifications for the next development cycle of the project or for the next project
- Suggesting appropriate next steps

The measurement and analysis of costs is also properly a part of summative evaluation. Elements to be considered in this regard include:

- Developing a model for obtaining and analyzing cost information. The model should allow not only for consistent analysis of project costs but also for projections (e.g., adding more students, more courses, more schools, more districts, or upgrading technology)
- Determining overall costs, component costs, and per-student, per-school and per-district costs
- Determining the cost of alternate educational methods with which to compare the costs of the program in question (e.g., traditional instruction, bussing to a central location, itinerant teachers, and alternate technologies)
- Recording all cost data, including "already paid for" costs (e.g., teacher time, administrative expenses, phones and postage, etc.)
- Relating costs to student educational gains and attitudes

PROGRAM INTEGRATION

At some point in the natural life of most projects, a decision must be made either to terminate the project or to integrate it into the school's basic program.

This might occur when:

- Some phase of the development or pilot period has come to a natural or logical end
- The entire project has been thoroughly tried, tested and fine-tuned--there is no more basic development work to be done
- The project funding ends or changes
- Political conditions indicate the need for expansion or integration
- All contractual obligations connected with the project have been fulfilled
- The need for the project to serve more students is seen by the school or the community
- The natural momentum of a successful project propels it into an expansion phase

At such a time, two basic questions need to be asked: (1) Should integration occur? and, if so, (2) How should such integration occur? Ideally, the mechanism for answering these questions should be planned at the outset of the project. However, as projects begin, the planners and funders can get caught up in the initial glamor of advanced technology or promise of dramatic educational gain through innovative means; and long-range planning is overlooked while short-term problems receive attention. The need to get a project off to a quick start or to meet an ambitious development schedule can also lead to this same long-range planning deficiency.

The "integration" of projects is easiest and most successful when:

- Specific plans for integration are developed and approved at the beginning of the project
- Project evaluation is built into plans and procedures from the outset, and this evaluation is carefully conducted so that decision makers have evidence on which to base their decisions
- The project has a broad base of support and ownership by all groups it affects

- The project is flexible enough to allow for modifications or adaptations

- The project is located in some part of the regular administrative structure rather than in a special area apart from the administrative flowchart

- Communication is open, all key administrators are kept informed of project progress, and as many of them as possible are involved in project operations

- There is early and frequent informal contact with key business and community members, "influencers" and "image makers" by personnel directly involved in the project's development and implementation

- Project leadership is stable and of high quality

- The political environment and the funding of the project are predictable and stable

- Project norms, values and procedures are seen as congruent with those of the school and community

- Administrators and teachers are provided thorough and continuous training in project goals, procedures and materials. (Adapted from Emory, p. 4)

Short-term success of a high quality distance education project is almost guaranteed when there is little displacement or disturbance of the educational system already in operation. However, integration of the project into the regular educational program over the long term will often require changes in policies, procedures, attitudes, funding patterns and the roles of educators. The greater these changes are, the more difficult the eventual integration will be.

CONCLUSION

Distance education is not a panacea. There are many educational problems it can solve, and just as many that it cannot. Distance education must be separated in our minds from the technology which delivers it. We are tempted to romanticize technology--and the more sophisticated or novel the technology is, the more this romanticizing occurs. Technology, in and of itself, cannot guarantee that learning takes place, care about students and their progress, replace human interaction, nor perform a host of other functions which are integral to quality teaching and true education. What technology can do, and do very well, is deliver quickly and over great distances large amounts of varied information. Depending on what its results are being compared to, it can often do this efficiently, effectively, and cheaply.

There are many alternatives to distance education. Whether it is used or not should be determined only after a careful examination of goals and objectives, financial constraints, student needs, administrator and teacher capabilities, community opinion, and the like. Distance education and its attendant technology should follow, not lead.

The potential of the technology does not guarantee its actualization. Some of us remember the television program "The Bionic Man" popular ten years ago. In the opening credits, as the scientists remake the body of Colonel Steve Austin with bionic parts, a voice solemnly intones, "We have the technology." This is true in education today. What we don't have is the ability to use the technology effectively and efficiently. Educational ideas and procedures are lagging behind technological capacity. For them to catch up, parts of our traditional educational system may have to change. All change is difficult; and the greater the change, the more difficult it usually is. However, distance education can be a catalyst for this change. "Educators have been driving into a new age of learning with their eyes on the rearview mirror," said Marshall McLuhan.

Is distance education an "adjunct" to more traditional kinds of education or is it "alternative" to them? If distance education is seen only as an "add on," it may work reasonably well, particularly over the short run, and may achieve some relatively limited purposes with considerable success. When it is seen as a new way of conceptualizing and structuring the very act of educating, it may produce highly gratifying results. At its best it can stimulate the students, energize the teaching staff and solidify the community while delivering exciting learning experiences to all three of these groups. Independent learners engaged in lifelong learning can be the result.

BIBLIOGRAPHY

Barker, B. and Logan, S., "Small High Schools Curricula: Alternative Delivery Systems for Meeting Essential Elements." Paper presented at Annual Conference of the Texas Association of Secondary School Principals, Austin, Texas, 1985.

Barnhardt, C., "Let Your Fingers Do the Talking: Computer Communication in an Alaskan Rural School." Washington, DC: National Institute of Education, 1984. ED 241 242

Bramble, W., "Distance Learning in Alaska's Rural Schools." Paper presented at Apple Education Conference, September 1986.

Downing, D., "Survey on the Uses of Distance Learning in the U.S." Austin, TX: Southwest Educational Development Laboratory, March 1984. ED 246 874

Dunnett, C., "Building Connections for the Growth of Distance Education," Educational Technology, December 1984.

Einsiedel, A. and Taylor, W., "Evaluation Study of an Expanded Distance Education System." Presented at the Annual Conference of the Canadian Association for the Study of Adult Education, Montreal, Quebec, 1985. ED 262 242

Emory, R. (ed.), Institutionalization: How Can We Continue Good Practices and Functions When the Funding Ends?, Portland, OR: Northwest Regional Educational Laboratory, October 1981.

Goldstein, M., "Issues of Law and Policy Affecting Telecommunications-Based Distance Learning." Austin, Texas: Southwest Educational Development Laboratory, 1984. ED 246 873

Hobbs, D., "Bridging, Linking, Networking in the Gap: Uses of Instructional Technology in Small Rural Schools." Washington, DC: Department of Education, July 1985. ED 258 786

Hudson, H. and Boyd, C., "Distance Learning: A Review for Educators." Austin, Texas: Southwest Educational Development Laboratory, 1984. ED 246 872

Krabbe, N. and Cornelius, R., "Technology and the Geographically Isolated School District: A Summary of Alternatives." Educational Technology, May 1986, p. 46.

Levinson, C., "Education by Telecommunications at the Elementary and Secondary Level: Practices and Problems," T.H.E. Journal, April 1985.

_____, "The School Problem Solver's Guide to Distance Education." Austin, Texas: Southwest Educational Development Laboratory, 1984. ED 253 380

Martin, D., "Audiographic Conferencing in Small Rural Schools in New York State: A Model for Developing Shared Teleconferenced Services Between Rural School Districts." Council of Chief State School Officers Conference, Portland, OR, February 1985. (Also in Teleconferencing and Electronic Communications V, Parker, L. and Olgren, C. (eds.), Madison, WI: University of Wisconsin, 1986.

McBeath, R., "Educational Technology to Enhance Learning at a Distance: A Systematic Approach." Paper presented at the Conference of the International Council of Educational Media, Banff, Canada, October 1984. ED 255 194

Minnesota Department of Education, "Minnesota Technology Demonstration Sites." January 1986

Naylor, M., "Distance Education: Overview." Columbus, OH: ERIC Clearinghouse on Adult, Career and Vocational Education. ED 259 214

O'Connor, B. and Levinson, C., (ed.), "Regional Forum on Distance Learning, A Report." Austin, Texas: Southwest Educational Development Laboratory, 1984. ED 247 910

Pease, P. and Tinsley, P., "Reaching Rural Schools Using an Interactive Satellite Based Educational Network: Evaluating TI-IN Network's First Year." Paper presented at the National Rural and Small Schools Conference, Bellingham, WA, October 1986.

_____, "TI-IN Network: Evaluating the Diffusion and Adoption of an Interactive-Instructional Satellite System." In Teleconferencing and Electronic Communication V, Parker, L. and Olgren, C. (ed.). Madison: University of Wisconsin, 1986.

Reynolds, C., "Enriching the Rural School Curriculum Through Telecommunications." Second National Rural and Small Schools Conference, Bellingham, WA, October 1986. (Will be available from ERIC).

Senate Education Committee, New York State Senate, "Satellite-Based Education: A Preliminary Review of the Feasibility of Satellite-Based Educational Communications Technology. Albany, NY, 1985. ED 262 774

Stewart, Keegan, and Holmberg, Distance Education: International Perspectives. New York, NY: St. Martin's Press, 1983.

Wedermeyer, C., Learning at the Back Door. Madison, Wisconsin: University of Wisconsin Press, 1981.

APPENDIX

CORRESPONDENCE CLASS

DELIVERY: Print based correspondence courses. School has regularly ordered from two institutions:

Brigham Young University, Independent Study, 206 Harmon, Continuing Education Building, Provo, UT 84602, 801/378-2868

University of North Dakota, Division of Independent Study, Box 5036, Fargo, ND 58102, 701/777-3044

A useful catalog of institutions offering correspondence:

The Independent Study Catalog, NUCEA Book Order Department Peterson's Guides, P.O.B. 2123, Princeton, NJ 08504, ($5.95 plus $1.25 postage and handling)

COSTS: Purchase price of course: $65.00-150.00 per student.
Supervising teacher for one period.
Mailing costs.

CONTACT: Ms. Nancy Hobbs
Liberty High School
Spangle, WA 99031
509/245-3229

INTRODUCTION TO WRITING FICTION USING ELECTRONIC MAIL

DELIVERY: Computer based system using electronic mail: one computer station for telecommunications (computer, two drives, modem, telecommunications software, word processor); additional word processing stations with printers; one computer station for the bulletin board system (hard disk for file server, bulletin board software).

COSTS: Computer workstations: $2,000-2,500.00 each.
Dedicated phone line: $150.00/month (not always required)
Monthly toll charges: $20-50.00/month

CONTACT: Ms. Ellen Halseth, Master Teacher or
Mr. Maurice Paul, Principal
Jefferson High School
Jefferson, OR 97352
503/327-1122

RESOURCES FOR VOCATIONAL AGRICULTURE USING TELECOMMUNICATIONS

DELIVERY: Computer based system using online information services. Requirements: computer, modem, printer, telecommunications software, subscription to AgriData Network

COSTS: Hardware costs (see previous costs), Subscription fee: $240.00/year, royalty fees for some of the reports: approx. $40.00/month. Phone access is through an 800 number.

CONTACT:
Mr. Carl Reynolds
Department of Vocational Education
University of Wyoming
Laramie, WY
307/766-4188

ASTRONOMY AND CALCULUS USING AUDIOGRAPHICS

DELIVERY AND COSTS: Audiographics system (1 per school): IBM PC XT ($3,000); Optel Telewriter II system ($4,650) from Optel Communications, Inc., 322 Eighth Avenue, New York, NY 10001, 212/741-9000

Speakerphone: $300-500 each

Audioconference bridge: This is necessary to connect all sites in a network over phone lines. The project paid for bridge service on AT&T's Alliance.

Example bridge costs for six schools over 1 year:
(# of min/week x $0.25/min x 34 weeks x 6 =)

150 min x .25 x 34 x 6= $7,650
Per school cost= $1,275

Long distance charges from bridge to school over 1 year:

$0.37/min x 150 min/week x 34 x 6= $3,774
Per School cost= $629

CONTACT:
Mr. Denis J. Martin
Telecommunications Coordinator
Deleware-Chenango BOCES
RD 3
East River Road
Norwich, NY 13815
607/334-2771

An additional contact in the Northwest: The Colville Center of the Community Colleges of Spokane has five rural communities receiving classes using audiographics technology.

Mr. Herb Munro
Director
Community College Center in Colville
E165 Hawthorne, MS 3092
Colville, WA 99114-2698
509/684-3230

ELECTRONICS USING SLOW SCAN TV AND AUDIOGRAPHICS

DELIVERY: Slow-scan TV: transceiver, data access component, color video camera and monitor, and modified data telephone. Electronic blackboard: computer, image capture and transmit device, graphics tablet and modem. Audioconferencing: speakerphones activated by buttons. Data grade phone line and a voice grade phone line.

COSTS: This project was a pilot study and most of the equipment was leased but if the equipment was purchased, rough costs are as follows: Two slow-scan systems: $22,000, two electronic blackboard systems (without computers): $5,000. Two speakerphone systems: $1,000

Slow-scan available from: Colorado Video Inc., Box 928, Boulder, CO 80306, 303/444-3972

Audiographics: Optel Communications, Inc., 322 Eighth Avenue, New York,NY 10001, 212/741-9000

Audioconferencing: Darome, Inc., 5725 N. East River Road, Chicago, IL 60631, 800/435-6174

CONTACT: For project description: Mr. Lowell Chamberlain, Coos ESD, 1350 Teakwood, Coos Bay, OR 97420

For technical details: Mr. Terry Weaver, SWOCC, Coos Bay, OR 97420 503/888-7378

SATELLITE DELIVERY: FOUR EXAMPLES

Instruction via Satellite from Eastern Washington University and ESD 101

COSTS: Ku band satellite receiver (purchase and installation); toll free number and speakerphone; programming, materials and support for 2 courses: approximately $16,000.00

CONTACT: Dr. Ted Roscher
West 1025 Indiana
Spokane, WA 99205-4562
509/456-7660

Arts and Sciences Teleconferencing Network--Oklahoma State University

COSTS: C band satellite dish, receiver and monitor (approx. $2000); Apple IIe, printer and accessories ($1500); speech recognition ($950); modem and communications software ($500); foreign language software ($450); text materials ($60 per student); subscription fee for up to 10 students ($1750)

CONTACT: Ms. Leigh Walters
ASTN
206 Life Sciences East
Oklahoma State University
Stillwater, OK 74078-0276
405/624-5647

Distance Accelerated Learning from Utah Board of Education

COSTS: Complete package prerecorded on videotape includes 80 telecasts, 80 computer programs, 7 classroom games, 80 student dialogs, student exercises ($1600/year)--does not include computers or TV monitor

Contact: Mr. Robert Ives
Utah State Office of Education
250 East 500 South
Salt Lake City, UT 84111
801/533-4774

TI-IN Network, Inc.

COSTS: TI-IN provides equipment, installation, maintenance and programming. Equipment purchase: $5500, Equipment Installation: $3300-5800, Annual Subscription Fee: $5,050. The subscriber pays for the installation of a direct dial phone line (not on a switchboard). Toll free phone service provided by TI-IN.

Contact: TI-IN Network, Inc.
100 East Nasa Road 1
Webster, TX 77598
713/554-5545

STATEWIDE NETWORKS

Minnesota

CONTACT: Mr. Gil Valdez
Minnesota Department of Education
550 Cedar Street
St. Paul, MN 55101

Alaska

CONTACT: Alaska Department of Education
Office of Instructional Services
800 West 10th Street
Box F
Juneau, AK 99811
907/465-3883